

REMARKS

Claims 1-53 are pending in the application.

Claims 1-53 stand rejected.

Claims 1-3, 42-46, 48-50 and 50 have been amended.

Rejection of Claims under 35 U.S.C. § 103

Claims 1-23 and 42-53 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Zlotnick, et al., U.S. Publication No. 2004/0205312 (Zlotnick) in view of Yanai, et al., U.S. Patent No. 5,742,792 (Yanai).

While not conceding that the cited references qualify as prior art, but instead to expedite prosecution, Applicant has chosen to respectfully disagree and traverse the rejection as follows. Applicant reserves the right, for example, in a continuing application, to establish that the cited references, or other references cited now or hereafter, do not qualify as prior art as to an invention embodiment previously, currently, or subsequently claimed.

In order for a claim to be rendered invalid under 35 U.S.C. § 103, the subject matter of the claim as a whole would have to be obvious to a person of ordinary skill in the art at the time the invention was made. *See* 35 U.S.C. § 103(a). This requires: (1) the reference(s) must teach or suggest all of the claim limitations; (2) there must be some teaching, suggestion or motivation to combine references either in the references themselves or in the knowledge of the art; and (3) there must be a reasonable expectation of success. *See* MPEP 2143; MPEP 2143.03; *In re Rouffet*, 149 F.3d 1350, 1355-56 (Fed. Cir. 1998).

The claimed invention is directed to a synchronous replication for system and data security, an example of which is claimed in amended independent claim 1:

1. A method comprising:
replicating an operation on data from first data storage in a first security domain to second data storage in a second security domain, wherein
the first security domain and the second security domain are independent of one another,
the first security domain permits a first host in the first security domain to directly access
the first data storage, and
the first security domain prohibits a second host in the second security domain from
directly accessing the first data storage;
awaiting a receipt of an acknowledgement that the operation on the data has been completed in
the second security domain; and
completing the operation on the data in the first security domain in response to the receipt of the
acknowledgement that the operation on the data has been completed in the second
security domain, wherein the completing the operation in the second security domain
comprises completing the operation on the data in second data storage in the second
security domain.

As can therefore be seen, the claimed invention (similarly claimed in the remaining independent claims, amended independent claims 42, 44 and 49), the claimed invention provides for replication between security domains that takes care to ensure that the operation being performed on the data in the second security domain before completing the operation in the first security domain. In so doing, the claimed invention avoids the situation in which both security domains suffer data corruption in attempting to complete the operation in question. Applicants respectfully submit that Zlotnick, even in view of Yanai (and/or skill in the art at the time of

invention), are lacking in the requisite showing, teaching or suggestion to provide one of skill in the art with the knowledge needed to create a system of the claimed invention (and without even approaching the question of motivation to combine, as addressed below). As will be discussed subsequently, it will be appreciated that each and every claim term are taught or suggested by the reference (and/or skill in the art), in some permissible combination. *See* MPEP 706.02(j).

The following sections of Zlotnick are cited as teach various of the foregoing limitations:

“Further provided are a method, system, and program for maintaining a copy relationship between at least one primary volume and at least one corresponding secondary volume, wherein data in the at least one primary volume in the copy relationship is copied to the corresponding at least one secondary volume in the copy relationship. Writes are generated comprising data in the at least one primary volume to copy to the corresponding at least one secondary volume in the copy relationship in a first write mode and writes are generated comprising write requests to the at least one primary volume in the copy relationship to copy to at least one corresponding secondary volume in a second write mode. A plurality of the writes are transferred to the at least one secondary volume in the second write mode before processing at least one write to the secondary volume in the first mode. The processing of writes to the at least one secondary volume in the first write mode is delayed for a time period after processing all the writes to the at least one secondary volume in the second write mode in order to wait to receive a subsequent write to one primary volume in the copy relationship in the second write mode.” (Zlotnick, para. 11)

“In certain implementations, the primary 8 and secondary 18 sites may be implemented in different power boundaries, such that the destruction or substantial failure at one site will not impact the data stored at the other sites. Further, the primary 8 and secondary 18 sites may be in different geographical locations, in a same building, but different floors or rooms, in different buildings in a same geographical locations, or separated by a distance.” (Zlotnick, para. 25)

Fig. 1 of Zlotnick is also cited in this regard:

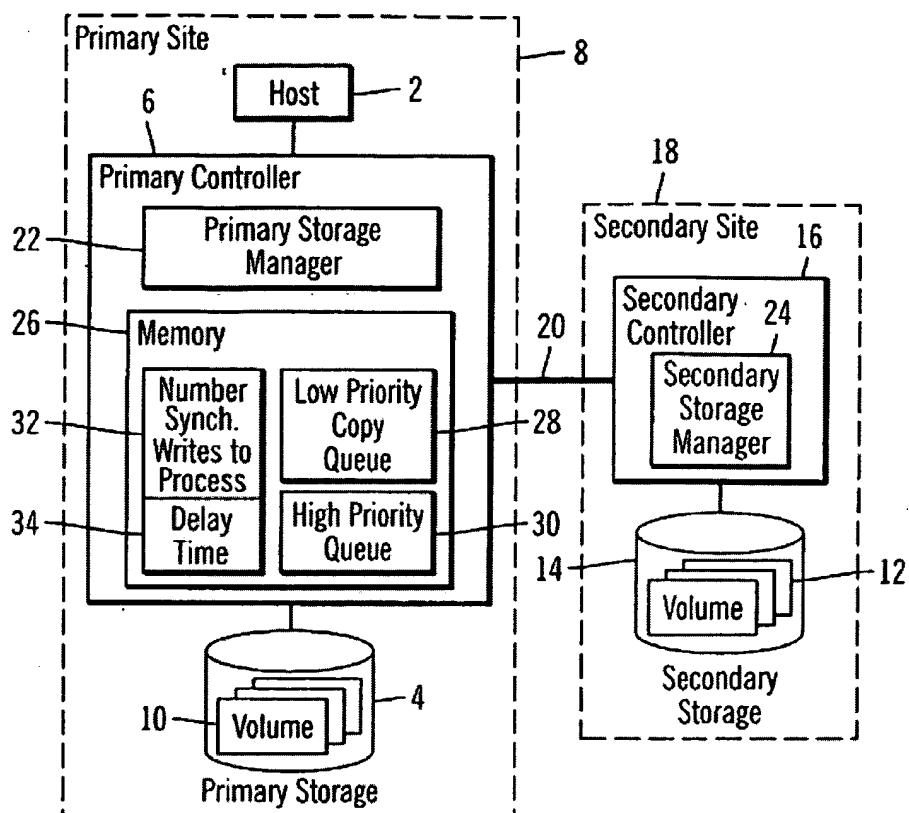


FIG. 1

The Office Action posits that the foregoing paragraphs and Fig. 1 of Zlotnick in some way show, teach or suggest first and second security domains. Applicants respectfully take issue

with this characterization. Primary site 8 and secondary site 18, as well as are described in the following manner in Zlotnick:

“In certain implementations, the primary 8 and secondary 18 sites may be implemented in different power boundaries, such that the destruction or substantial failure at one site will not impact the data stored at the other sites. Further, the primary 8 and secondary 18 sites may be in different geographical locations, in a same building, but different floors or rooms, in different buildings in a same geographical locations, or separated by a distance.

The primary controller 6 further includes a memory 26, which may comprise any volatile or non-volatile memory or storage device known in the art, that maintains the following information, which may be maintained in any data structure format known in the art:

Low Priority Queue 28: used to queue host write requests to which an asynchronous acknowledgment was returned, which may include those host write requests to primary volumes that have not yet been copied during the initial copy operation and the primary volumes 10 being copied as part of the initial copy operation. In certain implementations, the initial copy operations involve the processing of establish chains, where each establish chain is a group of data sets comprising a portion of the one or more primary volumes 10 that must be copied to establish the copy relationship. For instance, if the copy relationship involves 100 tracks, there may be ten establish chains often volumes each, thus ten entries in the low priority queue 22. The low priority queue 28 may further include any

host write requests handled asynchronously, like host write requests to primary volumes in a copy relationship that have not been copied to the corresponding secondary volumes as part of the initial copy operation. Further, host writes handled asynchronously may be grouped into large groups in order to accumulate an optimal amount of data for the transferring over the link 20 to secondary storage. Further, it is allowable to delay host write requests handled asynchronously because the host has already received acknowledgment and is not delayed by having to wait for a synchronous acknowledgment that the write request has been applied to the secondary volume 12 in secondary storage 14. The asynchronous host write requests may be placed in the low priority queue 28 such that they are processed following the establish chains of primary volumes 10 that are part of the initial copy operation.” (Zlotnick, paras. 25-27)

Nowhere in these passages are Applicants able to discern that Zlotnick’s primary and secondary sites represent, are intended to represent or could be interpreted as first and second security domains, as recited in the instant independent claims. In fact, such a concept (and even simply the word “security”) is nowhere to be found in Zlotnick. To state that Zlotnick’s primary and secondary sites convey some sort of security measures (with regard to access) greatly overstates Zlotnick’s disclosure. For example, there is no teaching in z that a user with access to one of Zlotnick’s sites. By contrast, the claimed invention specifically recites “... the first security domain prohibits a second host in the second security domain from directly accessing the first data storage”(Emphasis supplied) Not only is this borne out by the foregoing passages with regard to Zlotnick’s primary and secondary sites, such a position overstates the

capabilities of link 20, which provide neither the control nor the security of the claimed controlled communication link.

Next, the Office Action posits that the following limitation (as this limitation now reads):

“... ”

completing the operation on the data in the first security domain in response to the receipt of the acknowledgement that the operation on the data has been completed in the second security domain, wherein the completing the operation in the second security domain comprises completing the operation on the data in second data storage in the second security domain.

...”

is taught by the following passage of Zlotnick:

“High Priority Queue 30: used to queue host 2 write requests that are to be transmitted synchronously to the secondary controller 16 to store in the secondary storage 14. As discussed, host write requests directed to primary volumes that have already been copied over to the secondary storage as part of the initial copy operation are handled synchronously to ensure that the secondary copy is made. Such synchronously handled host write requests have higher priority in order to minimize delays in returning acknowledgment to the hosts 2.”

(Zlotnick, para. 28)

As will be appreciated, this passage of Zlotnick (and Zlotnick generally, in fact) provides no teachings as to the claimed acknowledgement's relation to the completion of the operation on the data in the first security domain in response the receipt of such an acknowledgement, particularly for typical operations. As can be seen above, nothing is said regarding acknowledgements in this passage. This is in keeping with Zlotnick's approach, which only uses mechanisms which might be characterized as comparable (a point which Applicant does not necessarily concede) for high priority write requests.

Applicant is further unable to identify any teachings as to the prevention of the completion of a write (or any other operation) based on such acknowledgement. While a desire to "... minimize delays in returning acknowledgment[s] ..." is made in Zlotnick (at para. 28), this cannot be extrapolated to the statement "... thus a write can not be completed without the acknowledgment being received" (Office Action, p. 4, section 7)

It is also noted in the Office Action, correctly, that "Zlotnick fails to specifically disclose the feature: "the first security domain permits a first host to access the first data storage, and the first security domain prohibits a second host from directly accessing the first data storage". The Office Action then attempts to equate Zlotnick's disclosure with this limitation by positing that "if the Primary Controller 6 happened to allow one host to access Primary Storage 4 and deny access to another host, this would teach all of the independent claims of the invention, since none of these claims require that a host be associated with the second security domain."

As is acknowledged in the Office Action, such a scenario is not contemplated by Zlotnick. In fact, no mention of the occurrence or desirability of a situation in which a primary controller allows one host to access primary storage, while not allowing another host access, is

presented neither in the cited portions of Zlotnick, nor the remaining portions thereof, insofar as Applicant is able to determine. Certainly, there is no discernible intention to suggest that Zlotnick provide such a feature or advantages of the claimed invention. Thus, as the Office Action correctly notes, one of skill in the art would not, and in fact could not, look to Zlotnick to teach a first security domain permitting a first host to access a first data storage, and a first security domain prohibiting a second host from directly accessing the first data storage.

The Office Action does not address the question of whether Yanai cures any of these infirmities, but it is Applicant's contention that Yanai, in fact, fails to cure any of the aforementioned shortcomings of Zlotnick, making the treatment of Yanai in this regard unnecessary, both for Applicant and Examiner alike.

Thus, correctly recognizing this deficiency in Zlotnick, the Office Action resorts to an attempt at combining Yanai with Zlotnick in an attempt to cure Zlotnick's infirmities. The Office Action cites Yanai as having a first and second host independently controlling first and second local networks. In support of this contention, the Office Action cites Fig. 1 and the following passage of Yanai:

"In a preferred embodiment, direct write access to a secondary (R2) volume is denied if remote mirroring is not suspended. When remote mirroring is suspended, direct write access to the secondary volume is still denied if a "sync required" attribute is set for the volume and the volume is not synchronized.

In accordance with another aspect of the invention, automatic recovery is selectively inhibited by domino modes. If a "volume domino mode" is enabled for

a remotely mirrored volume pair, access to a volume of the remotely mirrored volume pair is denied when the other volume is inaccessible. In a "links domino mode," access to all remotely mirrored volumes is denied when remote mirroring is disrupted by an all-links failure.

The domino modes can be used to initiate application-based recovery in lieu of automatic recovery. In one application-based recovery scheme, an application program maintains a log file of all writes ("before" or "after" images) to a data file. To ensure recovery, the application program always writes data to the primary (R1) copy of the log file before it is written to the primary (R1) copy of the data file. The degree of synchronization between the secondary (R2) and primary (R1) copies is selected so that the remote mirroring facility always writes data to the secondary (R2) copy of the log file before it is written to the secondary (R2) copy of the data file. Therefore, in the case of an all-links failure where host processing continues so far beyond the failure that all versions of the following updates are not retained, the secondary (R2) copy of the data file can be recovered if the primary (R1) copies are destroyed. In this case, if the secondary (R2) copy of the data file is corrupted, it is recovered using the changes recorded in the secondary (R2) copy of the log file." (Yanai, col. 4, ll. 50 *et seq*)

As an initial matter, Applicant respectfully submits that the particular parts of the foregoing citation of the reference that the Examiner has relied upon has not been designated as nearly as practicable, and the pertinence of this reference has not been explained adequately, both as required by 37 C.F.R. § 1.104(c)(2). Nevertheless, Applicant has made every effort to

respond to the rejections outlined by the Examiner. In this effort, Applicant has quoted above the material as Applicant believes the Office Action intends such to be the relevant portion(s) of Yanai. However, Applicants kindly request that a more definitive citation be provided, in order to enable Applicant to respond to the rejection in an appropriate and meaningful manner.

The Office Action suggests that the foregoing passages (and figure elements) teach the following claim elements:

“...
the first security domain permits a first host in the first security domain to directly access
the first data storage, and
the first security domain prohibits a second host in the second security domain from
directly accessing the first data storage;
...”

Applicant respectfully submits that the passages of Yanai deal with the control of whether or not Yanai's system is in a “domino mode,” which can be used to initiate application-based recovery in lieu of automatic recovery. Such approaches are concerned with preventing changes to one copy or another, based on the synchronization of one copy with another.

By contrast, the claimed invention is concerned with the security domain in which a given host and a given data storage resides. If the given host and the given data storage reside in the appropriate security domain, the given host is permitted direct access to the data storage resides, while if the data storage resides in another security domain, for example, the given host is prohibited from accessing the given data storage. Thus, Yanai's approach differs fundamentally from the claimed invention.

Thus, the Office Action does not establish the presence of these limitations in Zlotnick or Yanai, taken either alone or in permissible combination. The burden is on the Examiner to support a case of obviousness, including whether the prior art references teach or suggest all of the claim limitations. See MPEP 706.02(j).

For the reasons presented above, neither Zlotnick nor Yanai, alone or in combination, teach these limitations of amended independent claims 1, 42, 44 and 49.

In addition, Applicants also respectfully submit that the Examiner has not satisfied the burden of factually supporting the alleged motivation to combine the two references. The Examiner's duty may not be satisfied by engaging impermissible hindsight; any conclusion of obviousness must be reached on the basis of facts gleaned from the references. The Examiner must therefore provide evidence to suggest the combination and "[b]road conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence.'" See *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999). Further, the Office action does not establish that such a combination of the teachings of these references would meet with success, as required.

Zlotnick is directed to :

“...a method, system, and program for accessing a resource. Requests are generated to access a resource in a first access mode and a second access mode.

The requests are processed to access the resource in the second mode before processing at least one request to access the resource in the first access mode. The processing of the requests to access the resource in the first access mode is

delayed for a time period after processing all the requests to access the resource in the second access mode in order to wait to receive a subsequent request to access the resource in the second access mode.” (Zlotnick, Abstract)

By contrast, Yanai is directed to :

“Two data storage systems are interconnected by a data link for remote mirroring of data. Each volume of data is configured as local, primary in a remotely mirrored volume pair, or secondary in a remotely mirrored volume pair. Normally, a host computer directly accesses either a local or a primary volume, and data written to a primary volume is automatically sent over the link to a corresponding secondary volume. Each remotely mirrored volume pair can operate in a selected synchronization mode including synchronous, semi-synchronous, adaptive copy - remote write pending, and adaptive copy - disk. Direct write access to a secondary volume is denied if a "sync required" attribute is set for the volume and the volume is not synchronized. If a "volume domino" mode is enabled for a remotely mirrored volume pair, access to a volume of the pair is denied when the other volume is inaccessible. In a "links domino" mode, access to all remotely mirrored volumes is denied when remote mirroring is disrupted by an all-links failure. The domino modes can be used to initiate application-based recovery, for example, recovering a secondary data file using a secondary log file. In an active migration mode, host processing of a primary volume is concurrent with migration to a secondary volume. In an overwrite

cache mode, remote write-pending data in cache can be overwritten. Write data for an entire host channel command word chain is bundled in one link transmission.” (Yanai, Abstract)

Applicant respectfully submits that neither reference demonstrates that need for the technology described in the other’s disclosure. Zlotnick is directed to method, system, and program for accessing a resource using a first access mode and a second access mode. The accesses using the first access mode are delayed to allow for the completion of pending accesses in the second access mode. Zlotnick therefore provides a stand-alone solution for the sequencing of accesses employing multiple access modes.

By contrast, Yanai is directed to the remote mirroring of data. Yanai employs a primary in a remotely mirrored volume pair, or secondary in a remotely mirrored volume pair. The remotely mirrored volume pair can operate in one several synchronization modes. Thus, Yanai provides a stand-alone solution for the synchronization remotely mirrored volume pairs.

Given the disparate problems addressed by Zlotnick and Yanai, and the markedly different solutions each reference provides, Applicant respectfully submits that one of skill in the art at the time of invention would not perceive in either of Zlotnick or Yanai, the need for any concepts disclosed in the other reference’s disclosure.

Applicants therefore respectfully submit that such an argument fails to establish a *prima facie* case of obviousness and raises concerns with regard to resort to the use of a hindsight analysis of the references. The Office Action makes no showing of a motivation to combine Zlotnick with Yanai from within the references themselves; therefore, it must be presumed that

there is none. It is well-established that the best defense to hindsight is a “rigorous application of the requirement for a showing of a teaching or motivation to combine the prior art references.” *See Ecolochem, Inc. v. Southern California Edison Co.*, 227 F.3d 1361, 1371 (Fed. Cir. 2000); *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25 (Fed. Cir. 2000). A showing of combinability must be “clear and particular” and “broad conclusive statements about the teaching of multiple references, standing alone, are not ‘evidence.’” *See Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 666 (Fed. Cir. 2000); *Brown & Williamson*, 229 F.3d at 1125.

The reason, suggestion, or motivation to combine may be found explicitly or implicitly: 1) in the prior art references themselves; 2) in the knowledge of those of ordinary skill in the art that certain references, or disclosures in those references, are of special interest or importance in the field; or 3) from the nature of the problem to be solved, “leading inventors to look to references relating to possible solutions to that problem.”

Ruiz, 234 F.3d at 665.

The Office Action presents nothing more than broad, generalized statements related to the motivation of a person of ordinary skill, which Applicants respectfully submit is insufficient to support a finding of obviousness. The Office Action does not establish that the references which are combined are of special interest or importance in the field. Nor does the Office Action present any evidence of a problem to be solved from within those references themselves.¹ Instead, the Office Action fabricates such a problem to be solved, not from the teachings of the cited references, but from the teaching of Applicants’ own disclosure.

Using Applicants’ own disclosure as a blueprint for providing the motivation to combine prior art references in an obviousness determination is impermissible. *See W.L. Gore & Assoc. v.*

¹ There must be a finding that “there was a disadvantage to the prior systems, such that the ‘nature of the problem’ will have motivated a person of ordinary skill to combine the prior art references.” *Id.* at 666.

Garlock, 721 F.2d 1540, 1552-53 (Fed. Cir. 1983) (“To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.”).

Even if the disclosures of Zlotnick and Yanai were to be combined (though Applicant maintains such combination finds no motivation within their disclosure, nor in the skill in the art at the time of invention), the result would at best be inoperable, and at the least fail to make obvious the claimed invention. It might be posited that such a combination would result in a system capable of maintaining synchronization of remotely mirrored volume pairs, which would control the sequencing of accesses employing multiple access modes of the remotely mirrored volume pairs. However, such a “solution” suffers from at least two infirmities. First, Applicant is unable to locate any teaching in either reference as to how the systems and techniques of Zlotnick and Yanai might successfully be combined. More importantly, even if Zlotnick and Yanai could be successfully combined, a system and technique capable of maintaining synchronization of remotely mirrored volume pairs, while also sequencing accesses employing multiple access modes of the remotely mirrored volume pairs, fails to make obvious the claimed invention.

For these reasons, Applicants respectfully submit that the Office Action fails to present a *prima facie* case of obviousness of amended independent claims 1, 42, 44 and 49, and all claims dependent upon them, and that they are in condition for allowance. Applicants therefore request the Examiner’s reconsideration of the rejections to those claims.

Claims 16-23 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Zlotnick, et al., U.S. Publication No. 2004/0205312 (Zlotnick) and Yanai, et al., U.S. Patent No.

5,742,792 (Yanai) as applied to claim 1 above, and further in view of Orsley, et al., U.S. Patent Publication No. 2004/0059869 (Orsley). Given that the basis of this rejection depends on that of the preceding rejection that employs the combination of Zlotnick in view of Yanai, as applied to claim 1 above, Applicants respectfully submit that this rejection is overcome for at least the reasons presented with regard to allowability of claims 1-23 and 42-53, as they relate to the infirmities noted with respect to the combination of Zlotnick and Yanai.

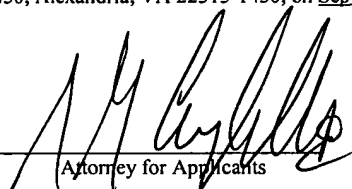
Claims 24-33 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Zlotnick, et al., U.S. Publication No. 2004/0205312 (Zlotnick) and Yanai, et al., U.S. Patent No. 5,742,792 (Yanai) as applied to claim 1 above, and further in view of Sawdon, et al., U.S. Patent Publication No. 2003/0158834 (Sawdon). Given that the basis of this rejection depends on that of the preceding rejection that employs the combination of Zlotnick in view of Yanai, as applied to claim 1 above, Applicants respectfully submit that this rejection is overcome for at least the reasons presented with regard to allowability of claims 1-23 and 42-53, as they relate to the infirmities noted with respect to the combination of Zlotnick and Yanai.


Claims 34-41 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Zlotnick, et al., U.S. Publication No. 2004/0205312 (Zlotnick) and Yanai, et al., U.S. Patent No. 5,742,792 (Yanai) as applied to claim 1 above, and further in view of Sawdon, et al., U.S. Patent Publication No. 2003/0158834 (Sawdon). Given that the basis of this rejection depends on that of the preceding rejection that employs the combination of Zlotnick in view of Yanai, as applied to claim 1 above, Applicants respectfully submit that this rejection is overcome for at least the reasons presented with regard to allowability of claims 1-23 and 42-53, as they relate to the infirmities noted with respect to the combination of Zlotnick and Yanai.

CONCLUSION

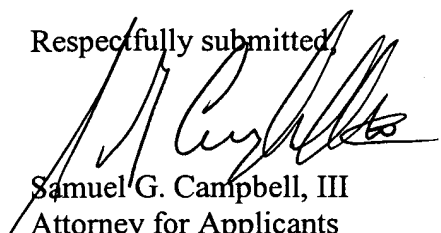
In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is invited to telephone the undersigned at 512-439-5084.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on September 11, 2006.


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Date of Signature

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